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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/078,182	02/19/2002	Charles Lange	P01,0383 (H17-25172)	5447

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EXAMINER
TURNER, SAMUEL A

ART UNIT	PAPER NUMBER
2877	

DATE MAILED: 09/11/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/078,182	LANGE, CHARLES	
	Examiner	Art Unit	
	Samuel A. Turner	2877	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____ .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-14 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-14 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Specification

In applicant's brief description of the drawings figure 1b, which is labeled as prior art, is described as showing the inventive elements while figure 1c which does show the inventive elements is not included. Please include a brief description of figure 1c.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-5, 8-10, 13, and 14 are rejected under 35 U.S.C. § 103(a) as being unpatentable over applicant's prior art figure 1a in view of Udd et al(Optical Fiber Rotation Sensing).

The prior art of applicant's figure 1a teaches a well known open loop Sagnac type fiber optic gyroscope comprising a broadband source(11), first coupler(12), polarizer(15), second coupler(17), sensing coil(10), phase modulator(19), and a phase sensitive detector(35). A bias modulator driver(20) is included to drive the phase modulator at the proper or fundamental frequency $f=1/2\tau$ to provide a $\pi/2$ bias to the counter-rotating beams. The modulator is usually driven using either a

sinusoidal or square waveform. The phase sensitive detector(35) includes a photodetector(13,14), synchronous demodulator(23) which provides the gyro output. The synchronous demodulator demodulates the gyro output signal suing the bias modulation drive signal(51). Not specifically taught is a sawtooth waveform used in driving the bias modulator.

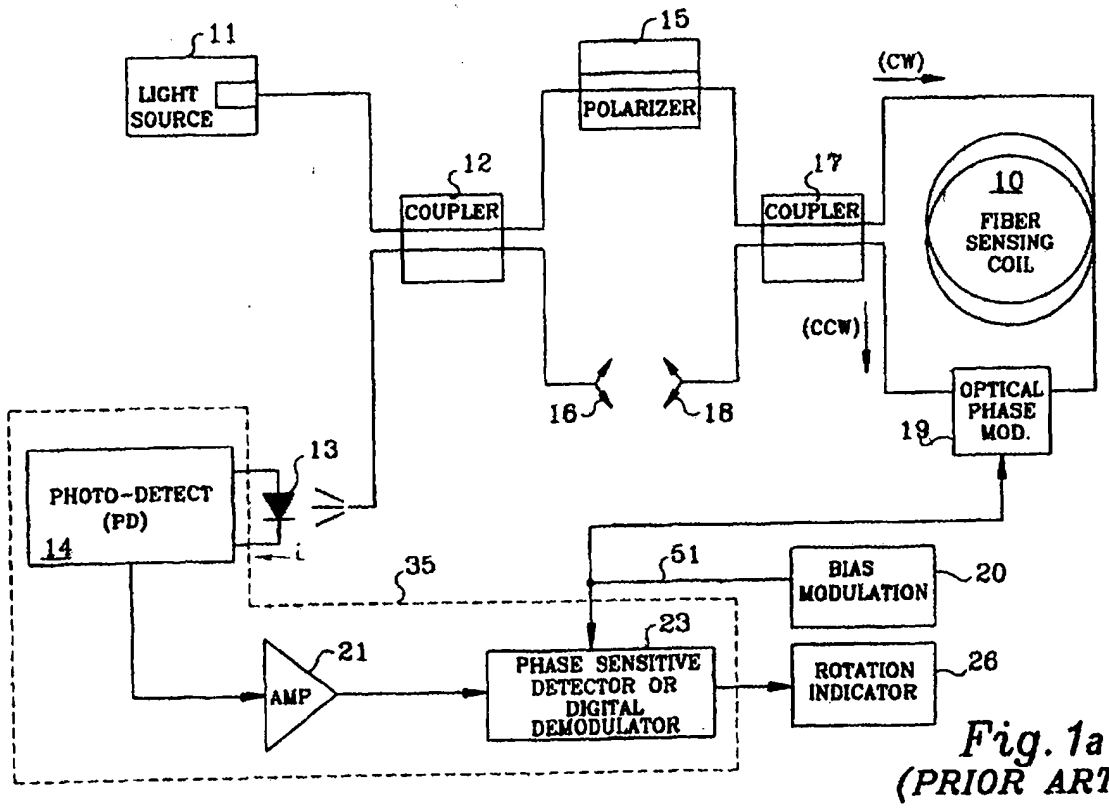


Fig. 1a (PRIOR ART)

In the Udd text, Chapter 3 entitled "Signal Processing Techniques" written by B.Y. Kim, specific attention is directed to figure 3.6 which shows several prior art phase modulator drive signals. Included are sinusoidal(a), square(d), triangular(b), and sawtooth(c). All of these different waveforms are used to drive a fiber gyro

phase modulator at the proper frequency f=1/2τ to provide a π/2 bias to the counter-rotating beams. Also note figure 3.5 which includes a symmetrical coupler.

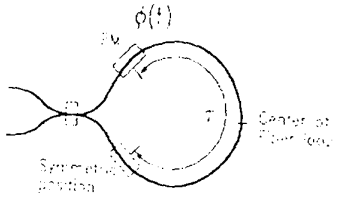


Fig. 3.5. A gyro sensing loop with a phase modulator (PM) located [illegible] of the loop.

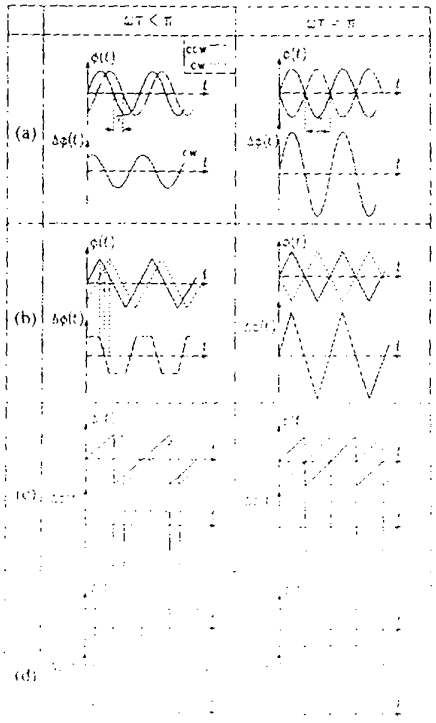


Fig. 3.6. Differential phase modulation waveforms $\Delta\phi(t)$ for several periodic phase modulation waveforms $\phi(t)$ and for two values of $\omega\tau$.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to drive the prior art fiber gyroscope shown in applicant's figure 1a by any of the known phase modulation waveforms including a sawtooth waveform.

Claims 6, 7, 11, and 12 are rejected under 35 U.S.C. § 103(a) as being unpatentable over applicant's prior art figure 1a and Udd et al(Optical Fiber Rotation Sensing) as applied to claims 1-5, 8-10, 13, and 14 above, and further in view of applicant's prior art figure 1b.

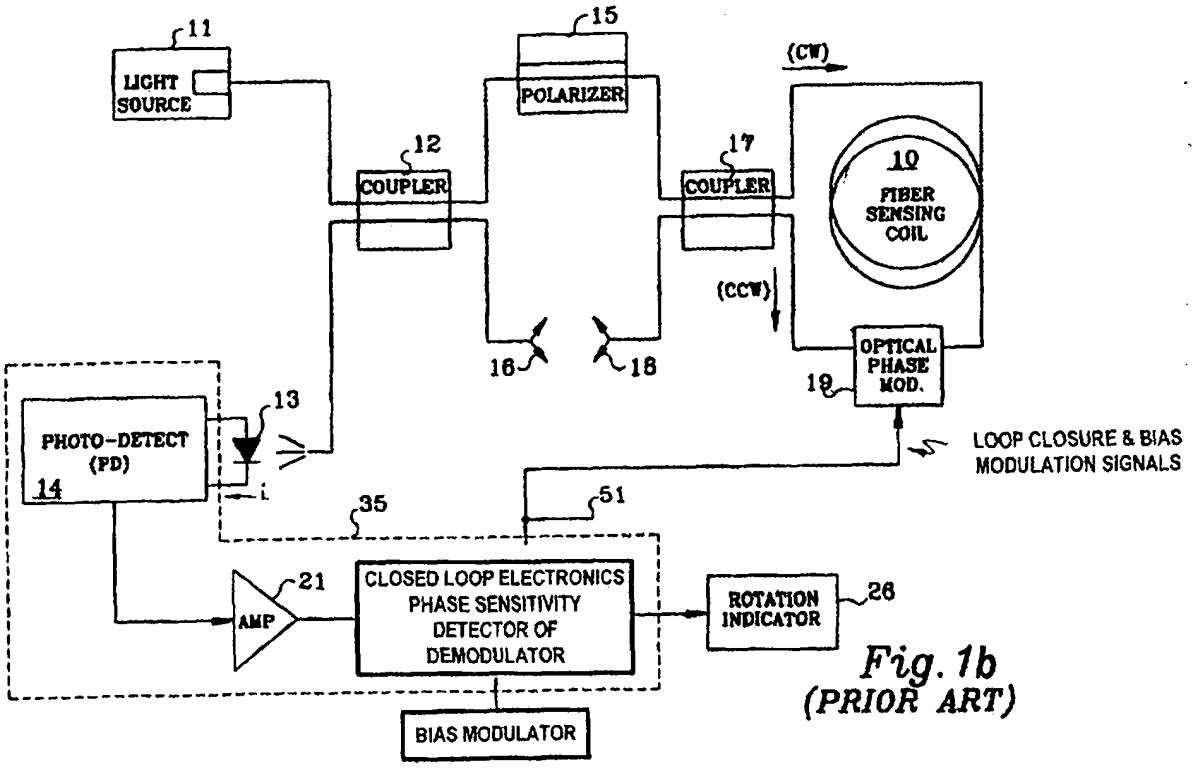


Fig. 1b
(PRIOR ART)

Applicant's prior art figure 1b further includes a closed loop fiber optic gyroscope configuration. In the closed loop configuration the output of the

synchronous demodulator(23) is used to drive a phase ramp or serrodyne waveform which is added to the bias modulator waveform. By closing the loop the gyro is drive by the ramp or serrodyne waveform to a phase null point.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to include a closed loop to drive the gyro back to the null point of maximum sensitivity.

With regard to claims 7 and 12; it would have been obvious to one of ordinary skill in the art to use a plurality of modulators instead of combining the ramp or serrodyne waveform with the bias waveform on a single phase modulator thus the different signals can be feed to separate symmetric modulators as found in figure 3.5 of Udd.

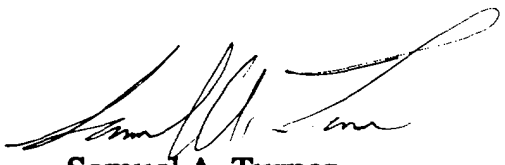
Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Samuel A. Turner those telephone number is **(703) 308-4803**. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Frank G. Font, can be reached on (703) 308-4881.

The fax phone number for this Group is (703) 308-7722. The faxing of papers related to this application must conform with the notice published in the Official Gazette, 1096 O.G. 30 (15 November 1989). The Group receptionist telephone number is (703) 308-0956.

Any inquiry of a technical nature regarding reissues, petitions, and terminal disclaimers should be directed to Hien Phan whose telephone number is (703) 308-7502, or Ed Westin whose telephone number is (703) 308-4823.

Any other inquiry of a technical nature, and all inquiries of a general nature including those relating to the status of this application or any patent term adjustment should be directed to TC2800 Customer Service Office whose telephone number is (703) 306-3329.



Samuel A. Turner
Primary Examiner
Art Unit 2877

SAT
9/5/03